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objects, made by persons with excellent imaginations and a little inaccurate information upon several scientific subjects. As a result nature study is looked upon, in some localities, as a rather frivolous pastime, which is not of any very great importance in the real business of education. There are several books, however, which do not attempt to show that all animate objects are spectacular, but rather attempt to direct attention to the manifestations of life in our everyday contact with it. It is to the latter kind of helps that Mr. D. Lange's excellent book belongs.⁴

The guiding principle of the book has been that pupils must see and examine real objects, not merely their pictures and descriptions. The lessons are planned with the idea of having pupils obtain their knowledge at first-hand so far as possible. Part of the work is arranged with reference to seasons, as "Life about our homes in the fall," and "Some forest trees in their winter conditions," while other sections deal with particular subjects, *e. g.*, "Geological action of water." Lessons about many of the common plants, birds, and mammals are presented in such an attractive style that even very young pupils will doubtless be entertained and instructed by following them. The author's aim is primarily to cultivate habits of observation; incidentally the pupil will obtain a great deal of valuable information.

The author says that in order to do good work it is not necessary that the teacher shall have taken a course in botany, zoology, or geology. It is possible that much good work may be done by some teachers who have not had such opportunities; however, it is beyond doubt that elementary science work in primary and secondary schools has suffered very greatly at the hands of teachers who have attempted to teach science subjects without having the necessary preparation for it. The book under discussion will certainly do much toward assisting weak teachers, but we insist that nothing short of thorough instruction in these sciences, added to ability to teach, can make teachers fully competent to handle nature study.—O. W. CALDWELL.

A satisfactory work on fertilizers.

THE marked increase in the use of commercial fertilizers in the United States has given rise to a demand for reliable information regarding the composition and utility of such goods. The official reports of those states which have laws regulating the sale of fertilizers give abundant analyses of mixed goods actually on the market, but the limits of such reports prevent any full discussion of the questions which arise in practice. A great mass of matter has been written in regard to feeding both plants and soils. Much of this matter is in the form of special pleading for some particular "system," and very little of it is recent or applicable to American conditions. The practical

⁴ LANGE, D.: Handbook of nature study. For teachers and pupils in elementary schools. 12mo. pp. xvi + 329, *figs.* 60. The Macmillan Company: New York. 1898.

worker and the investigator in field, garden, or greenhouse, felt the need of some reliable work dealing in a plain way with the principles and practice involved in economical plant feeding. Such a work has been supplied by Professor Voorhees,⁵ who has the happy faculty of telling what one wants to know, and telling it briefly. One is told what to do and given a reason for doing it, and due consideration is given to modifications required by special or unusual conditions.

The description of fertilizing material is up to date, and the formulas recommended for special crops are those that have been profitable in actual use; not the oft-reprinted ones that can be traced back only to advertising matter.

In addition to the specific information in regard to feeding plants, the botanist will doubtless welcome the clear, brief summary of the several broad systems of fertilization that have been proposed and advocated at great length by their authors.

The author is too genial to be accused of being a philosopher; but here and there he drops a remark that sets one to thinking of the broad questions involved in the production of plants, and then speedily leads one to see how the principles discussed can be reasonably and profitably applied.

The book will receive a hearty welcome from both investigator and farmer.
—H. A. HUSTON.

MINOR NOTICES.

THE FIRST NUMBER of *Rhodora*, the journal of the New England Botanical Club, has made its appearance. The editorial staff is as follows: B. L. Robinson, editor-in-chief; F. S. Collins, M. L. Fernald, and H. Webster, associate editors; W. P. Rich and E. L. Rand, publication committee. The purpose is tersely stated as follows: "This journal is founded by the New England Botanical Club, with confidence that it will give new stimulus and render material aid to the study of our local flora. . . . In the selection of subject-matter, special attention will be given to such plants as are newly recognized or imperfectly known within our limits, to the more precise determination of plant ranges, to brief revisions of groups in which specific and varietal limits require further definition, to corrections upon current manuals and local floras, to altitudinal distribution, plant associations, and ecological problems."

The first number contains the following papers: "Rattlesnake plantains of New England," by *M. L. Fernald*; "Saniculas of western Vermont," by

⁵ VOORHEES, EDWARD B. — Fertilizers: The source, character, and composition of homemade and manufactured fertilizers; and suggestions as to their use for different crops and conditions. 12mo. pp. xiv + 335. New York: The Macmillan Company. 1898. \$1.00.